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DIRECT FLIGHT APOLLO STUDY

PART II

AVAILABLE TO U.S. GOVERNMENT AGENCIES ONLY

(NASA-CR-59423) DIRECT FLIGHT APOLLO STUDY, PART 2 (McDonnell Aircraft Co.) 16 p
N74-74495

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Scientific and Technical Information Facility

BRIEFING
OCTOBER 3, 1962

DIRECT FLIGHT APOLLO STUDY

PART II

CASE FILE COPY

MCDONNELL

DOWNGRADED AT 3 YEAR INTERVALS;
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DOD DIR 5200.10

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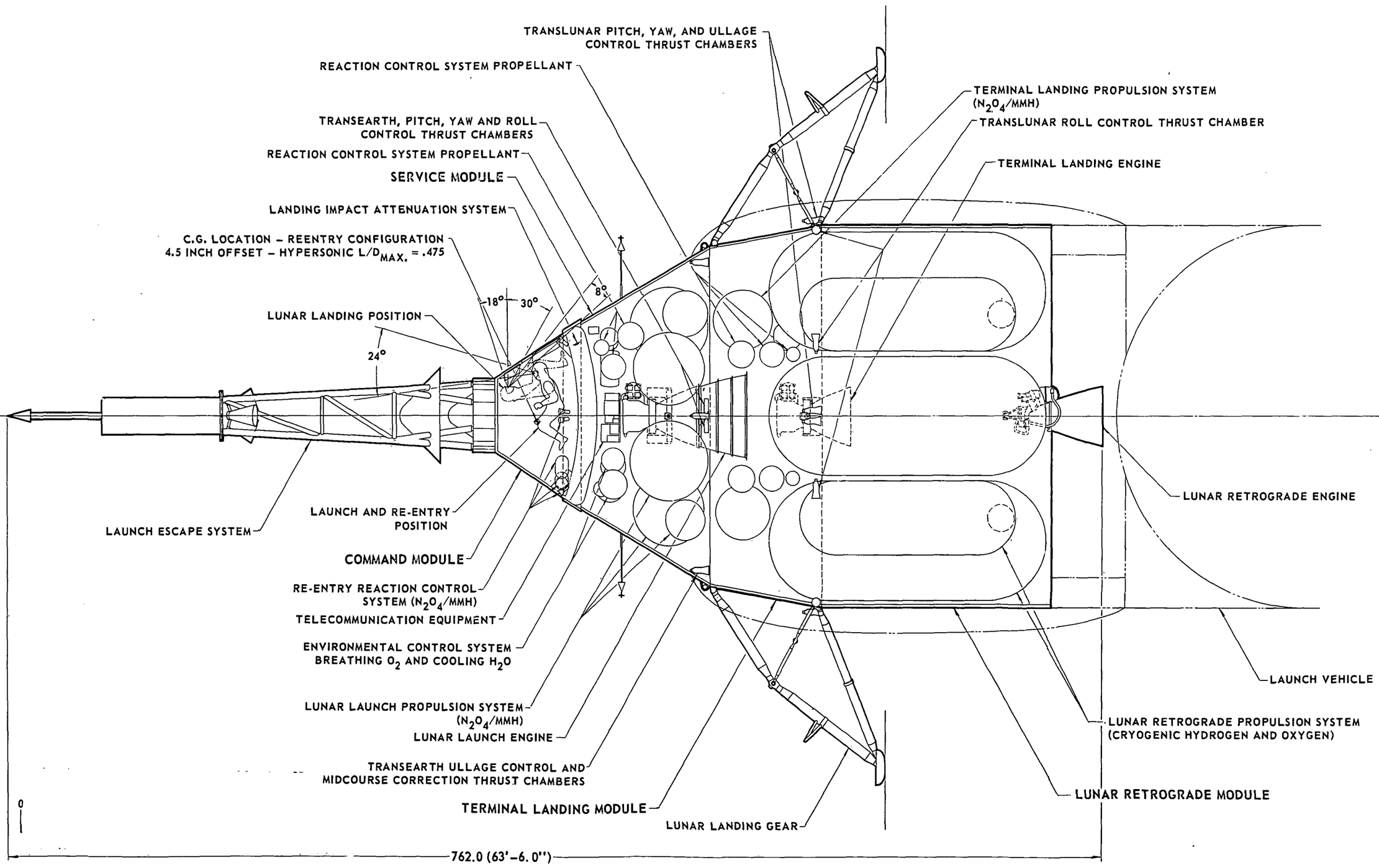
GENERAL ARRANGEMENT - TWO-MAN APOLLO SPACECRAFT



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STRUCTURE- COMMAND MODULE

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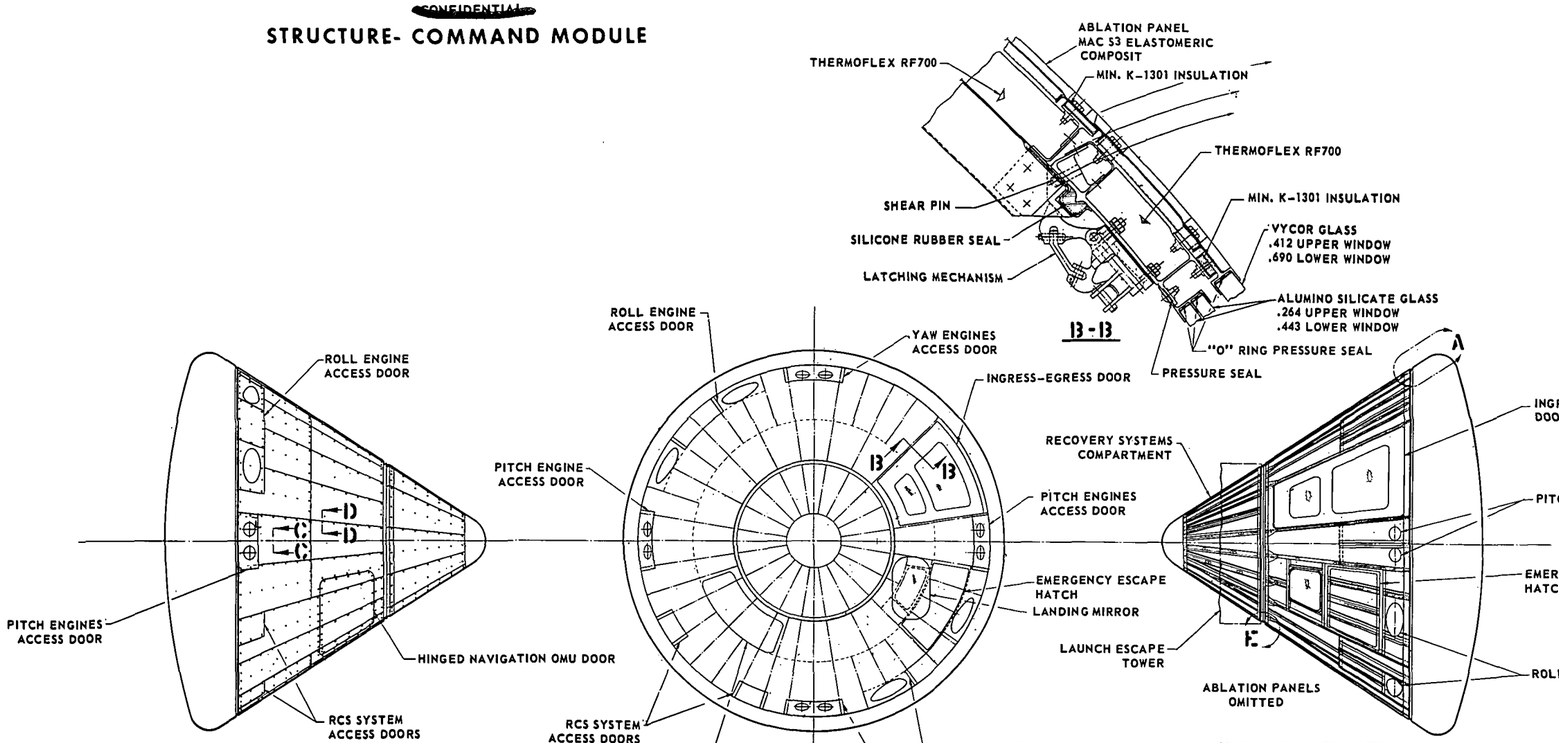
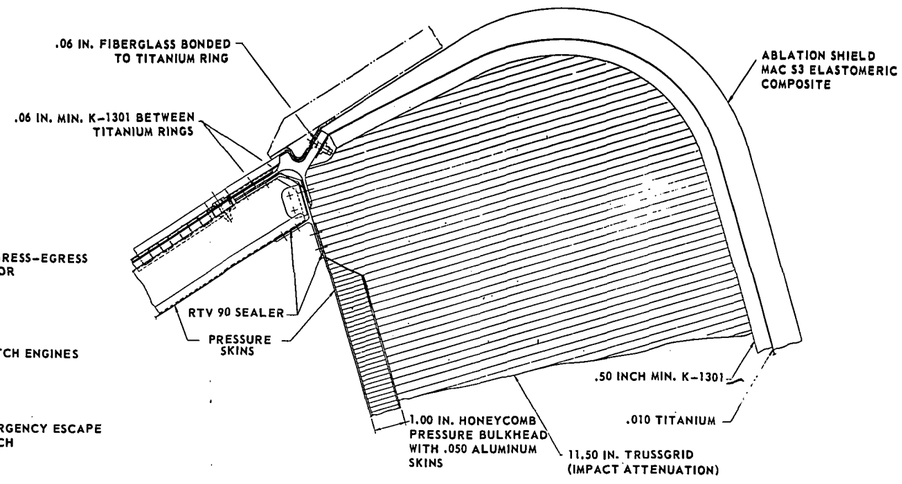
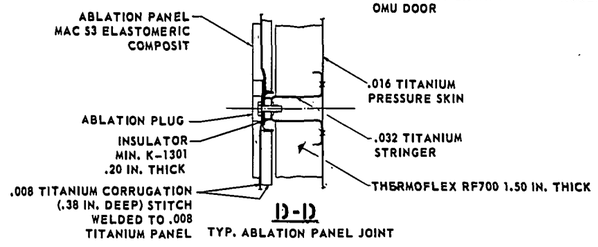
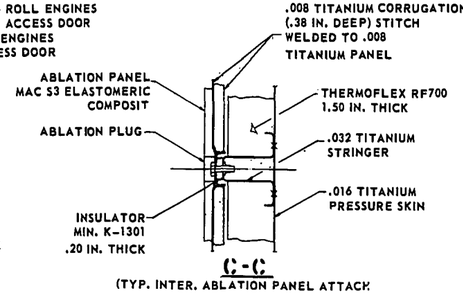
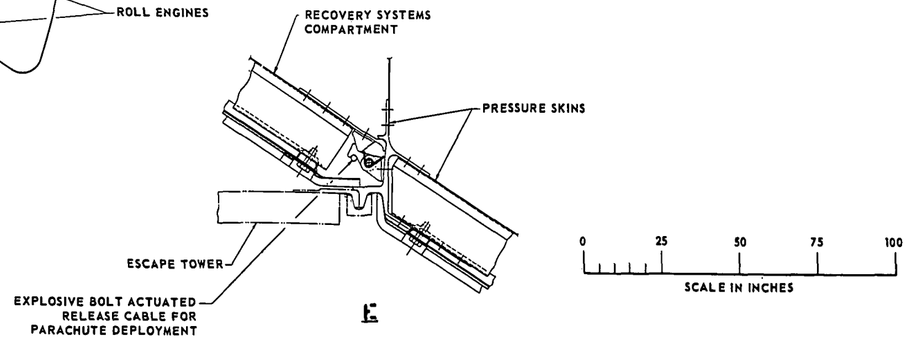



.06 IN. FIBERGLASS BONDED TO TITANIUM RING
.06 IN. MIN. K-1301 BETWEEN TITANIUM RINGS
ABLATION SHIELD MAC S3 ELASTOMERIC COMPOSITE
RTV 90 SEALER
PRESSURE SKINS
.50 INCH MIN. K-1301
.010 TITANIUM
1.00 IN. HONEYCOMB PRESSURE BULKHEAD WITH .050 ALUMINUM SKINS
11.50 IN. TRUSSGRID (IMPACT ATTENUATION)
A


ABLATION PANEL MAC S3 ELASTOMERIC COMPOSIT
.016 TITANIUM PRESSURE SKIN
ABLATION PLUG
.032 TITANIUM STRINGER
INSULATOR MIN. K-1301 .20 IN. THICK
THERMOFLEX RF700 1.50 IN. THICK
.008 TITANIUM CORRUGATION (.38 IN. DEEP) STITCH WELDED TO .008 TITANIUM PANEL
D-D
TYP. ABLATION PANEL JOINT


.008 TITANIUM CORRUGATION (.38 IN. DEEP) STITCH WELDED TO .008 TITANIUM PANEL
ABLATION PANEL MAC S3 ELASTOMERIC COMPOSIT
THERMOFLEX RF700 1.50 IN. THICK
ABLATION PLUG
.032 TITANIUM STRINGER
INSULATOR MIN. K-1301 .20 IN. THICK
.016 TITANIUM PRESSURE SKIN
C-C
(TYP. INTER. ABLATION PANEL ATTACH



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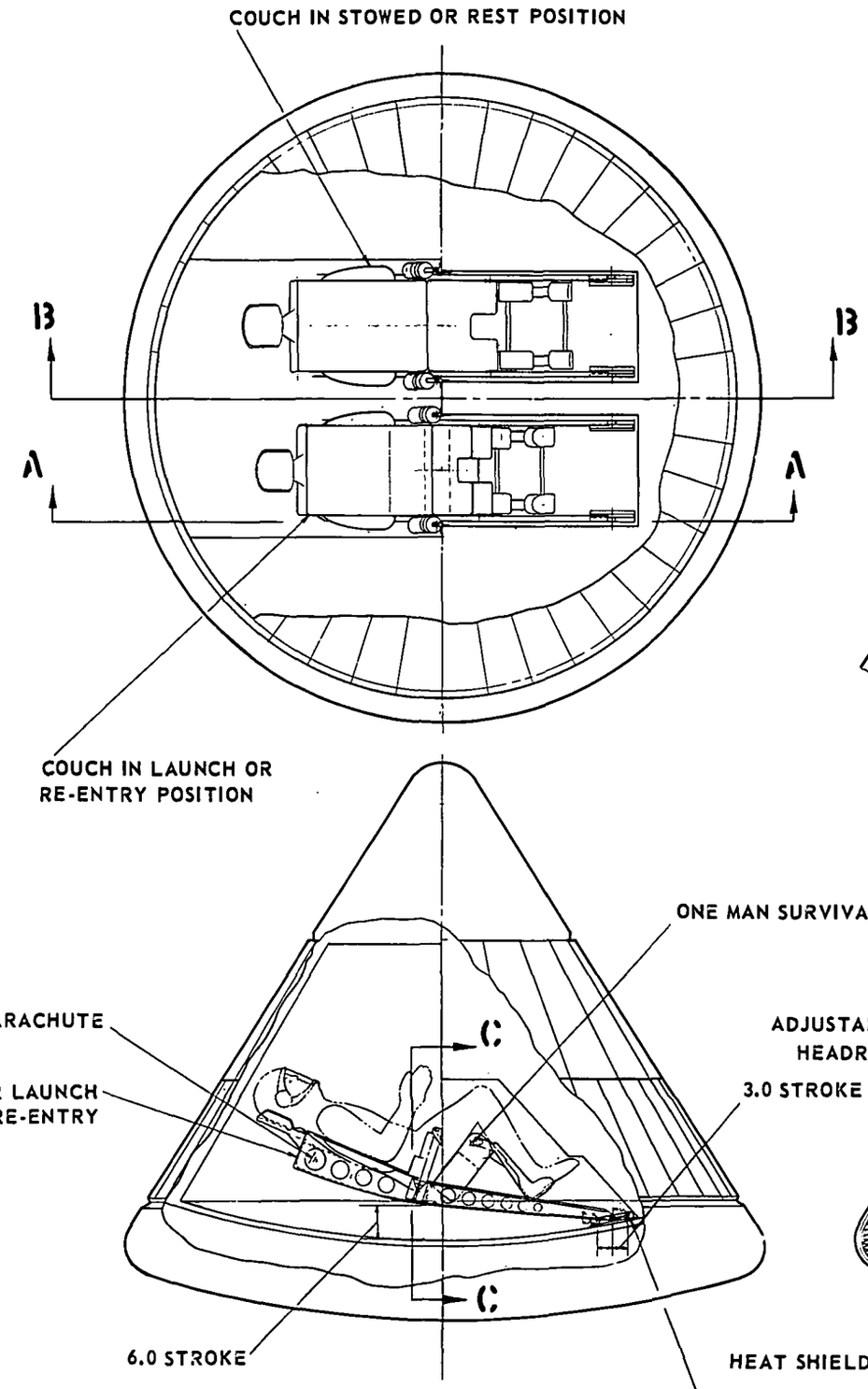
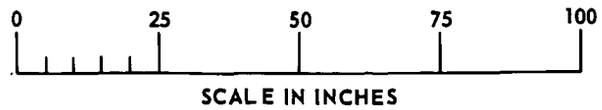
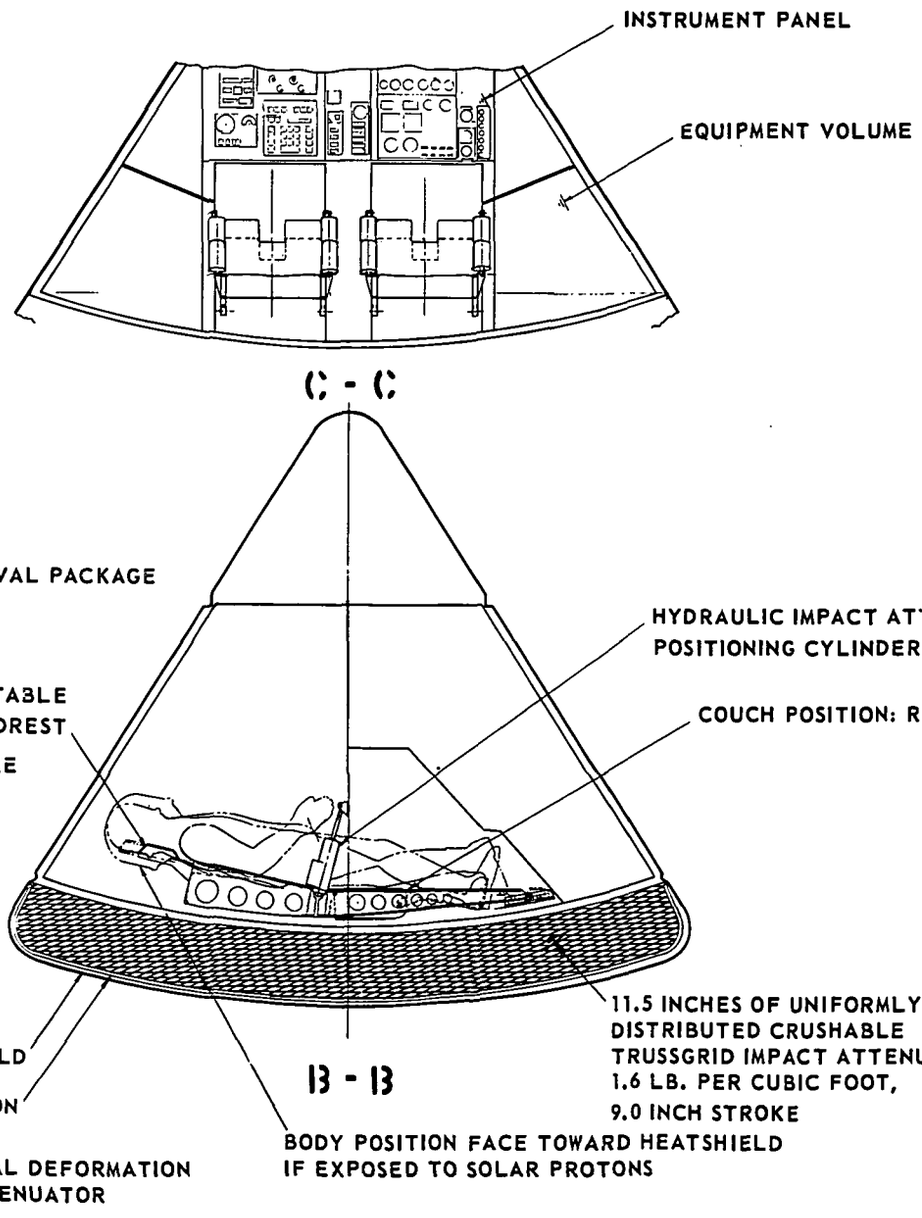
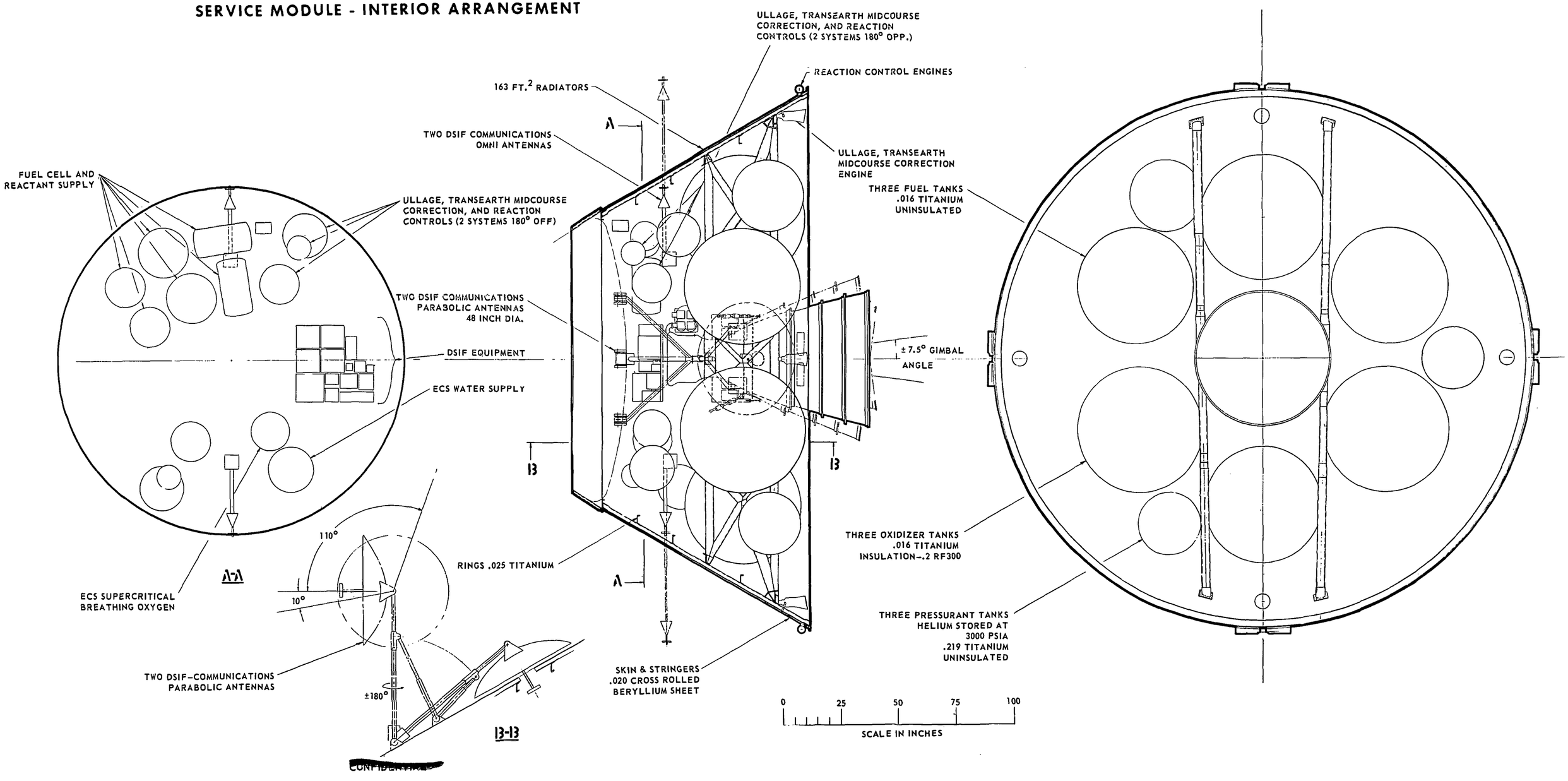
IMPACT ATTENUATION SYSTEMS COMMAND MODULE







SERVICE MODULE - INTERIOR ARRANGEMENT



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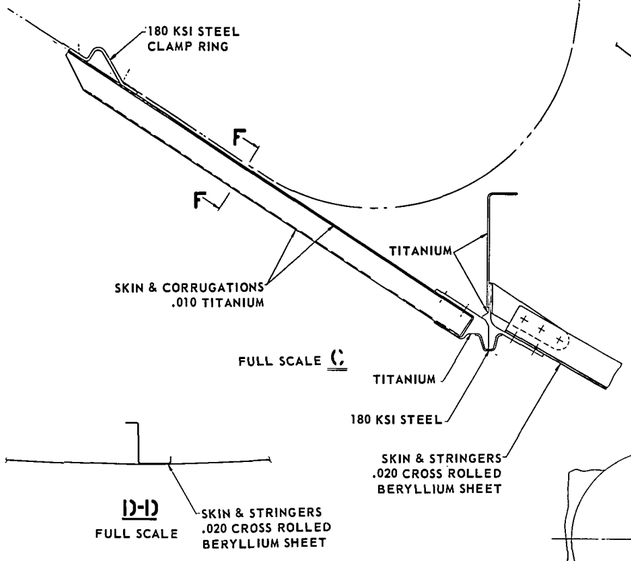
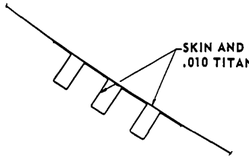
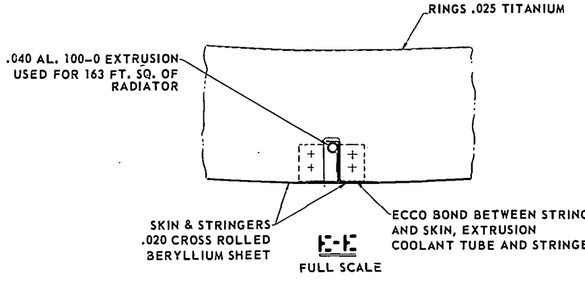
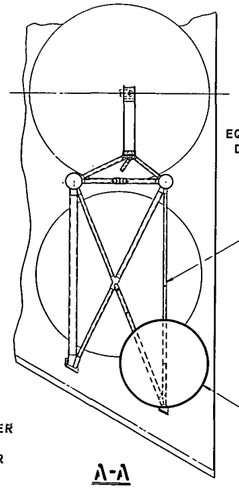
SERVICE MODULE STRUCTURE

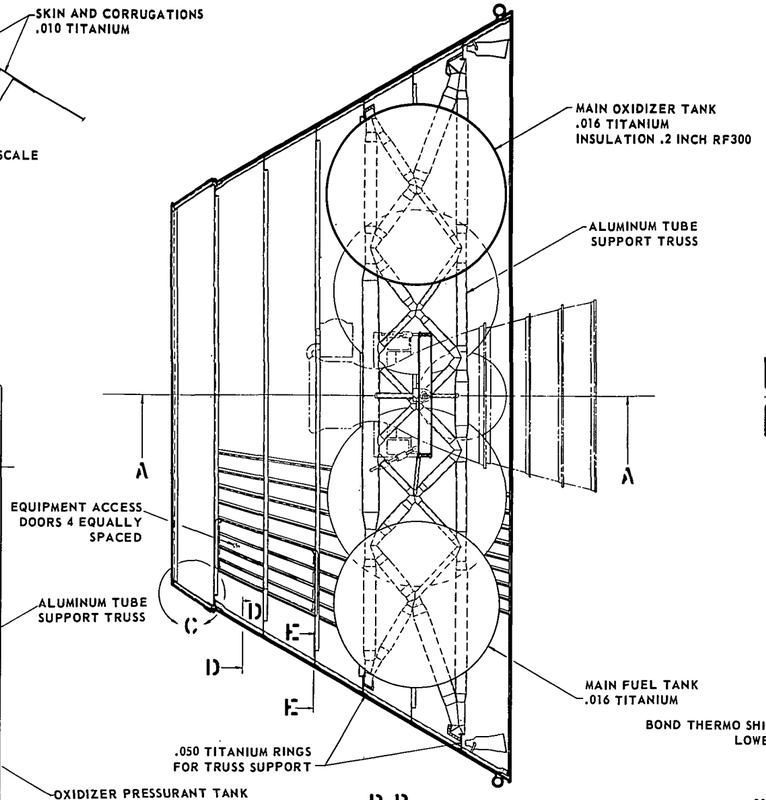


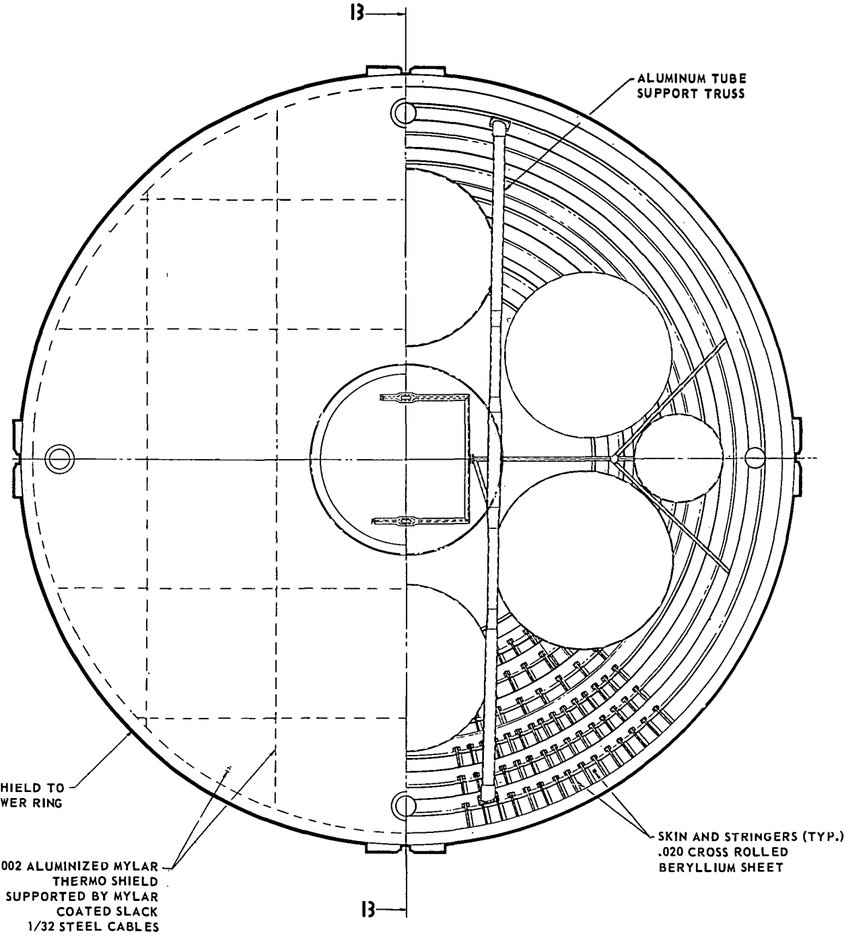


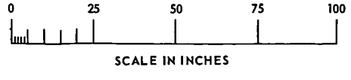
F-F FULL SCALE











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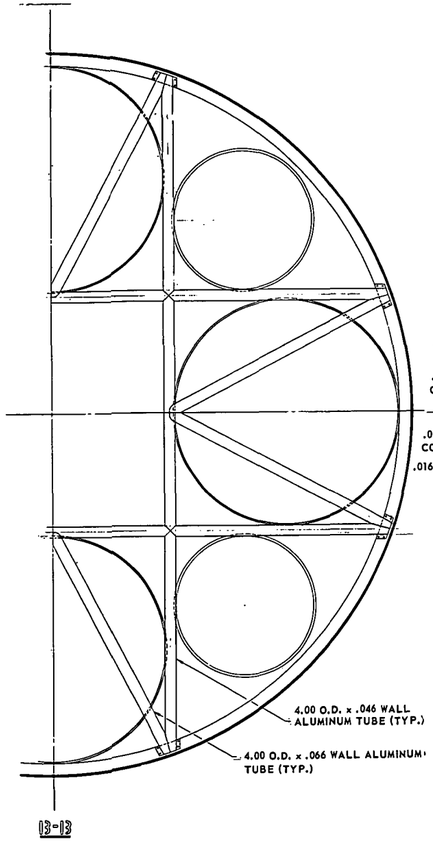
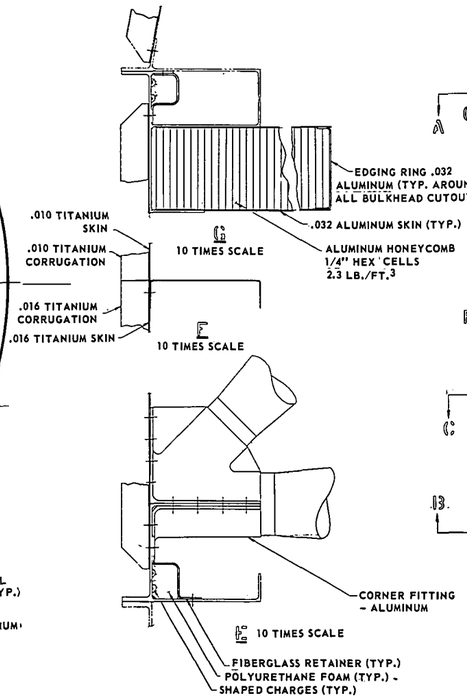
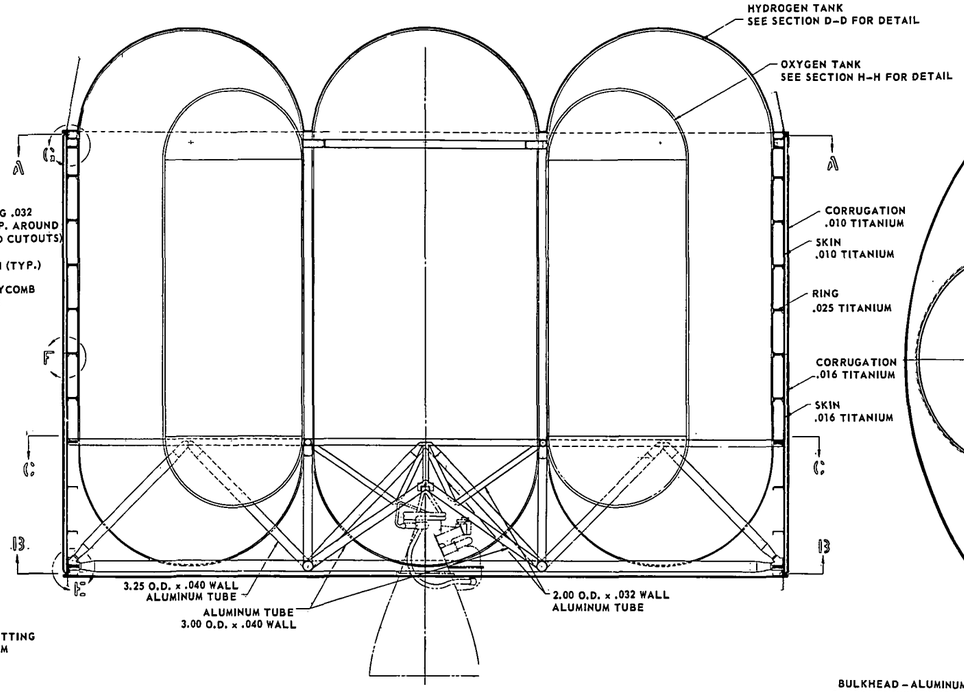
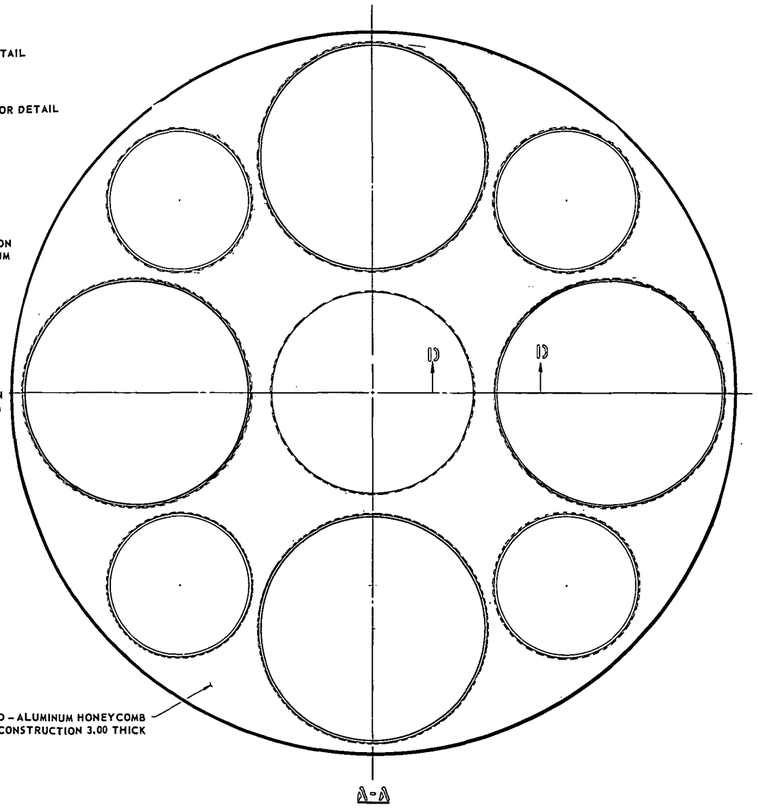
STRUCTURAL ASSEMBLY-RETROGRADE MODULE









0 10 20 30 40 50 60
SCALE

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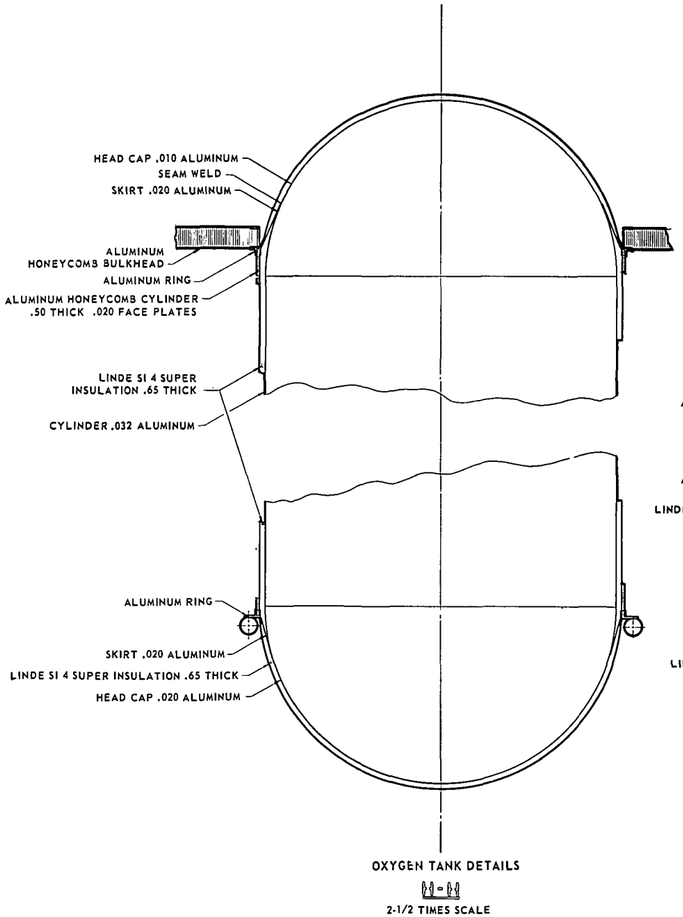
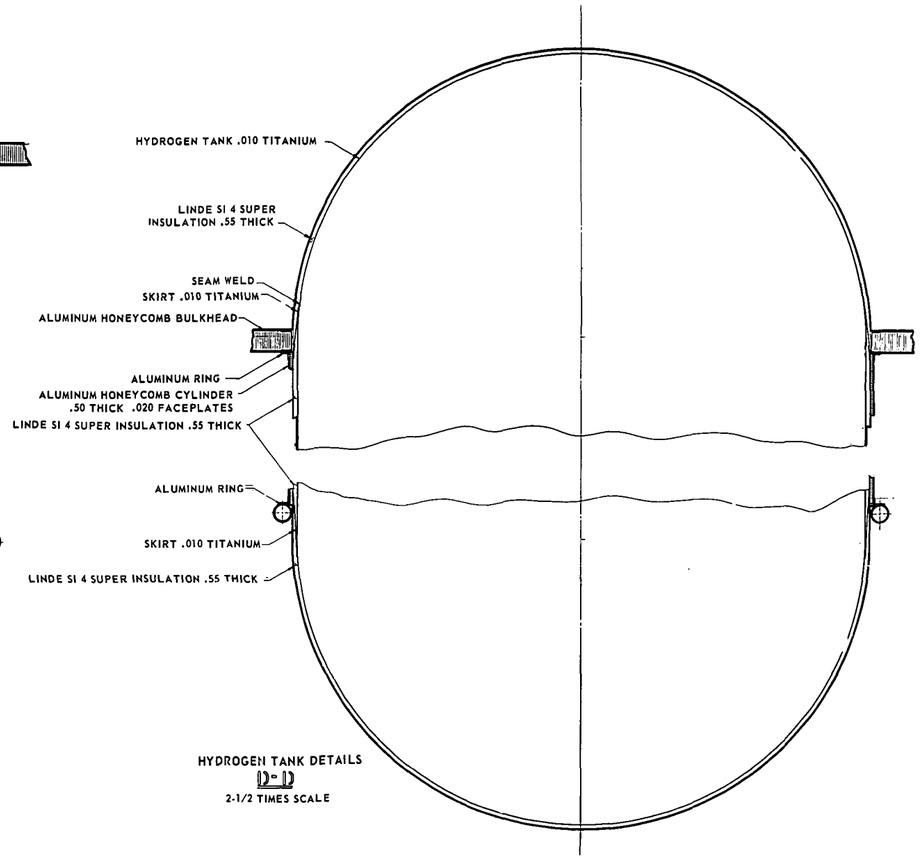
STRUCTURAL ASSEMBLY-RETROGRADE MODULE


HEAD CAP .010 ALUMINUM
SEAM WELD
SKIRT .020 ALUMINUM
ALUMINUM HONEYCOMB BULKHEAD
ALUMINUM RING
ALUMINUM HONEYCOMB CYLINDER .50 THICK .020 FACE PLATES
LINDE SI 4 SUPER INSULATION .65 THICK
CYLINDER .032 ALUMINUM
ALUMINUM RING
SKIRT .020 ALUMINUM
LINDE SI 4 SUPER INSULATION .65 THICK
HEAD CAP .020 ALUMINUM

OXYGEN TANK DETAILS

A-A

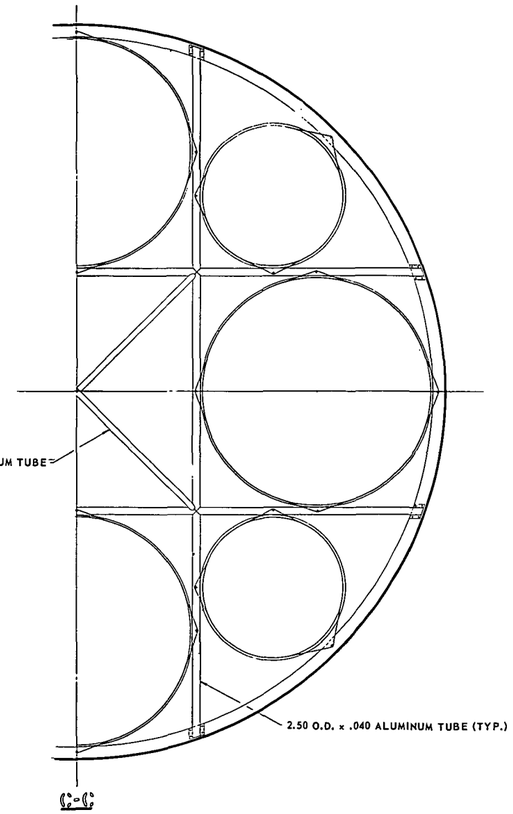
2-1/2 TIMES SCALE


HYDROGEN TANK .010 TITANIUM
LINDE SI 4 SUPER INSULATION .55 THICK
SEAM WELD
SKIRT .010 TITANIUM
ALUMINUM HONEYCOMB BULKHEAD
ALUMINUM RING
ALUMINUM HONEYCOMB CYLINDER .50 THICK .020 FACEPLATES
LINDE SI 4 SUPER INSULATION .55 THICK
ALUMINUM RING
SKIRT .010 TITANIUM
LINDE SI 4 SUPER INSULATION .55 THICK

HYDROGEN TANK DETAILS

B-B

2-1/2 TIMES SCALE



C-C

0 10 20 30 40 50 60

SCALE

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[redacted]

STRUCTURAL ASSEMBLY - TERMINAL LANDING MODULE

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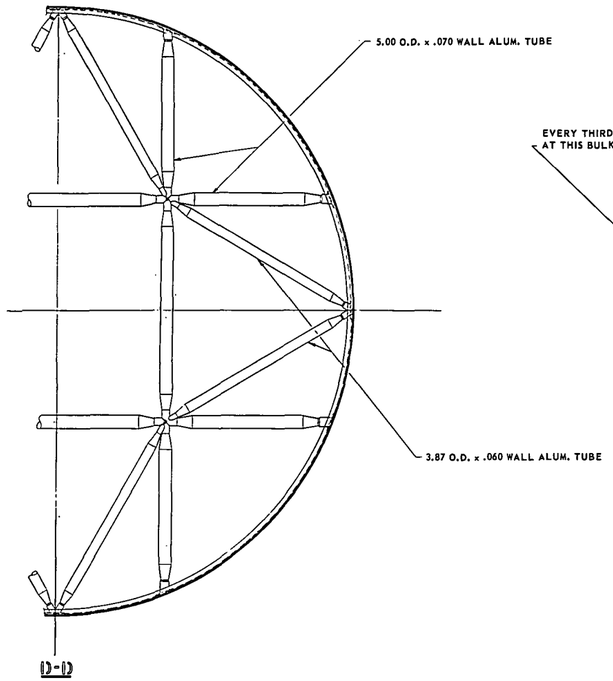
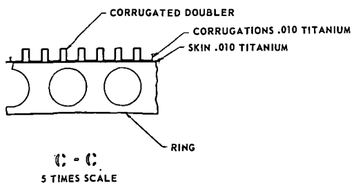
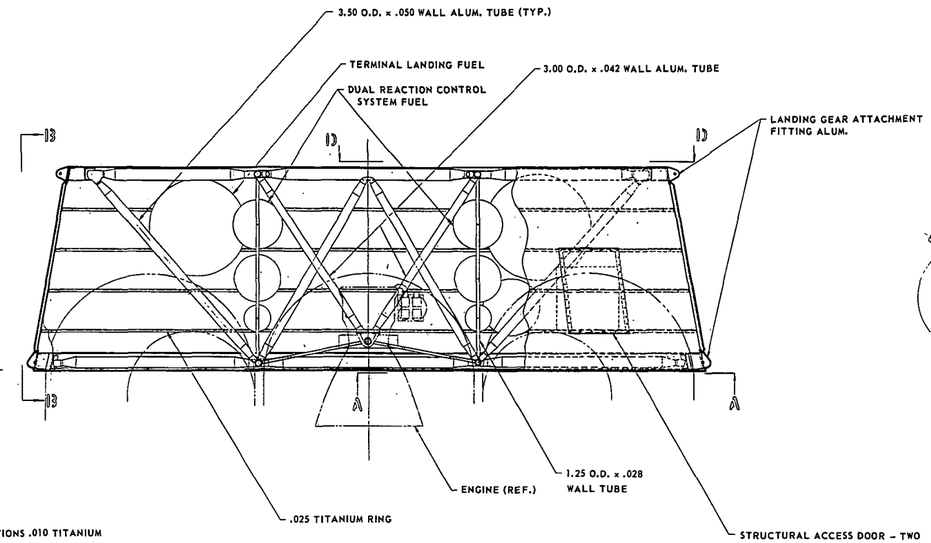
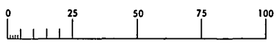


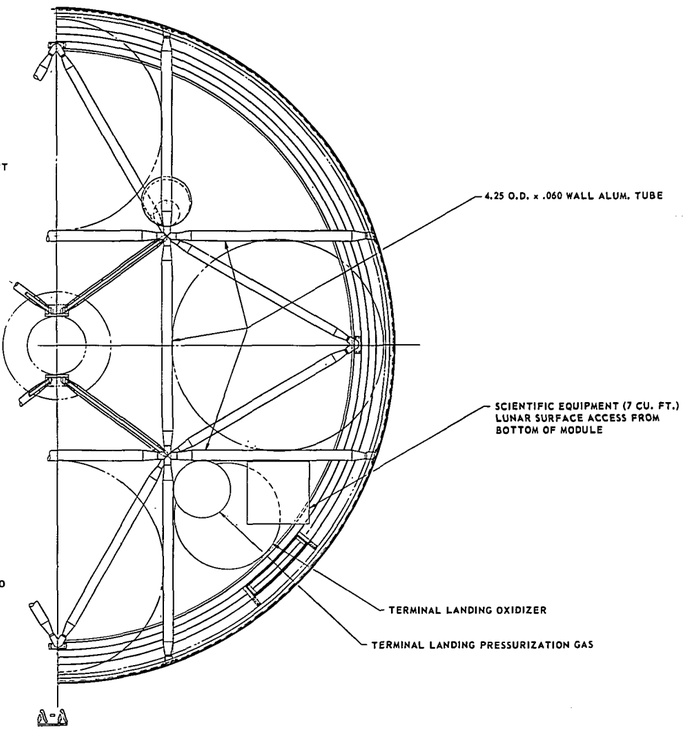


C - C
5 TIMES SCALE





SCALE IN INCHES

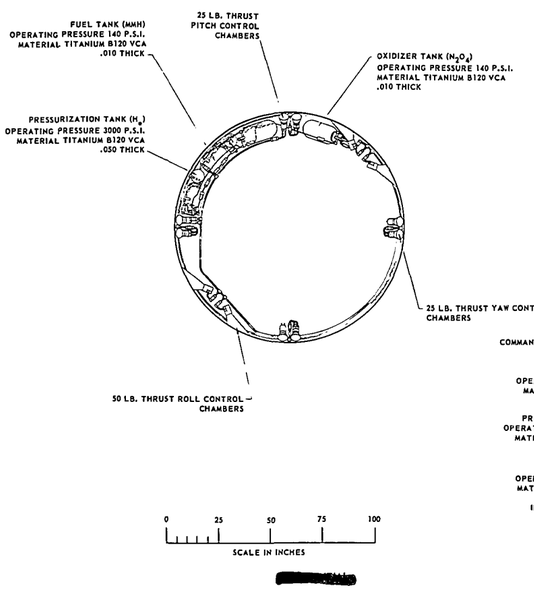

4.25 O.D. x .060 WALL ALUM. TUBE
SCIENTIFIC EQUIPMENT (7 CU. FT.) LUNAR SURFACE ACCESS FROM BOTTOM OF MODULE
TERMINAL LANDING OXIDIZER
TERMINAL LANDING PRESSURIZATION GAS
A-A

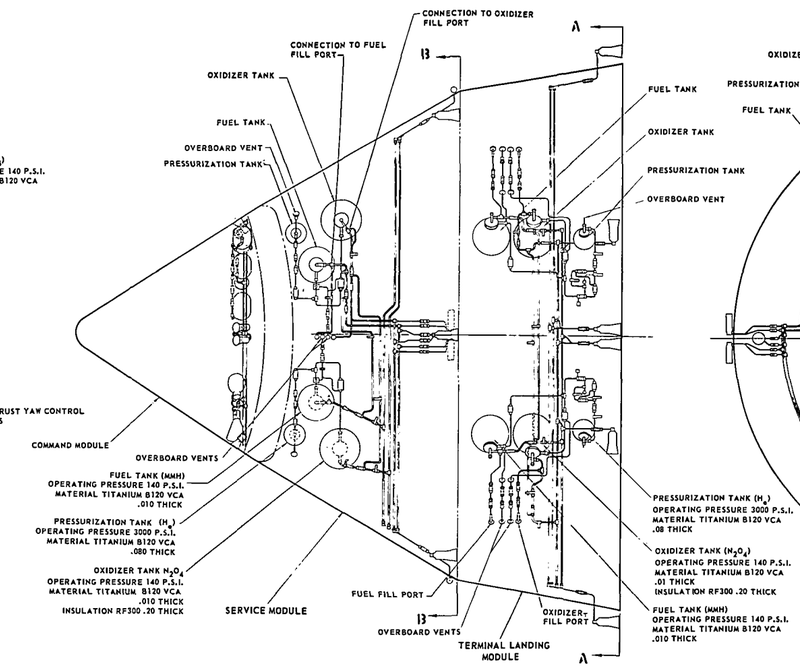
[redacted]

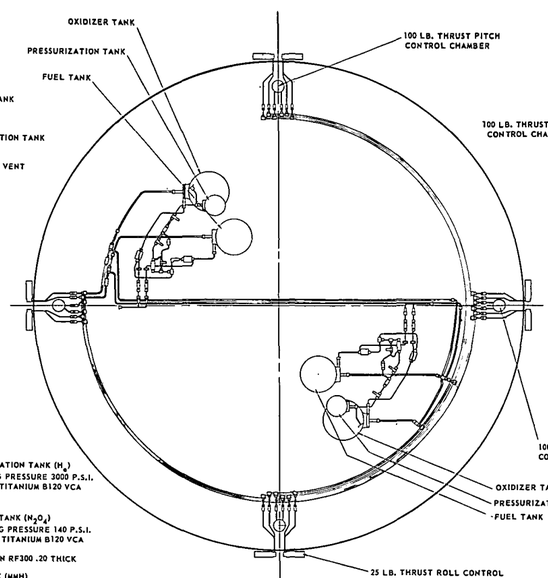
[redacted]

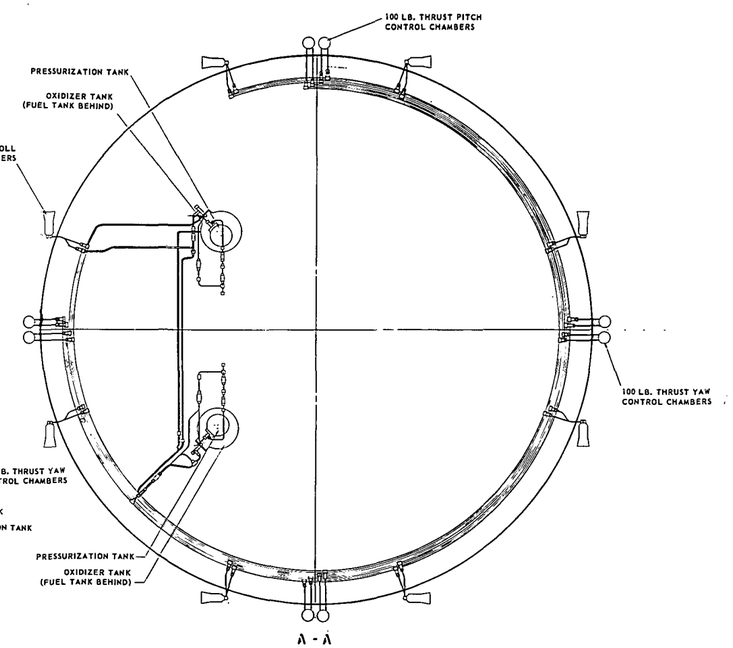
REACTION CONTROL SYSTEM

MCDONNELL





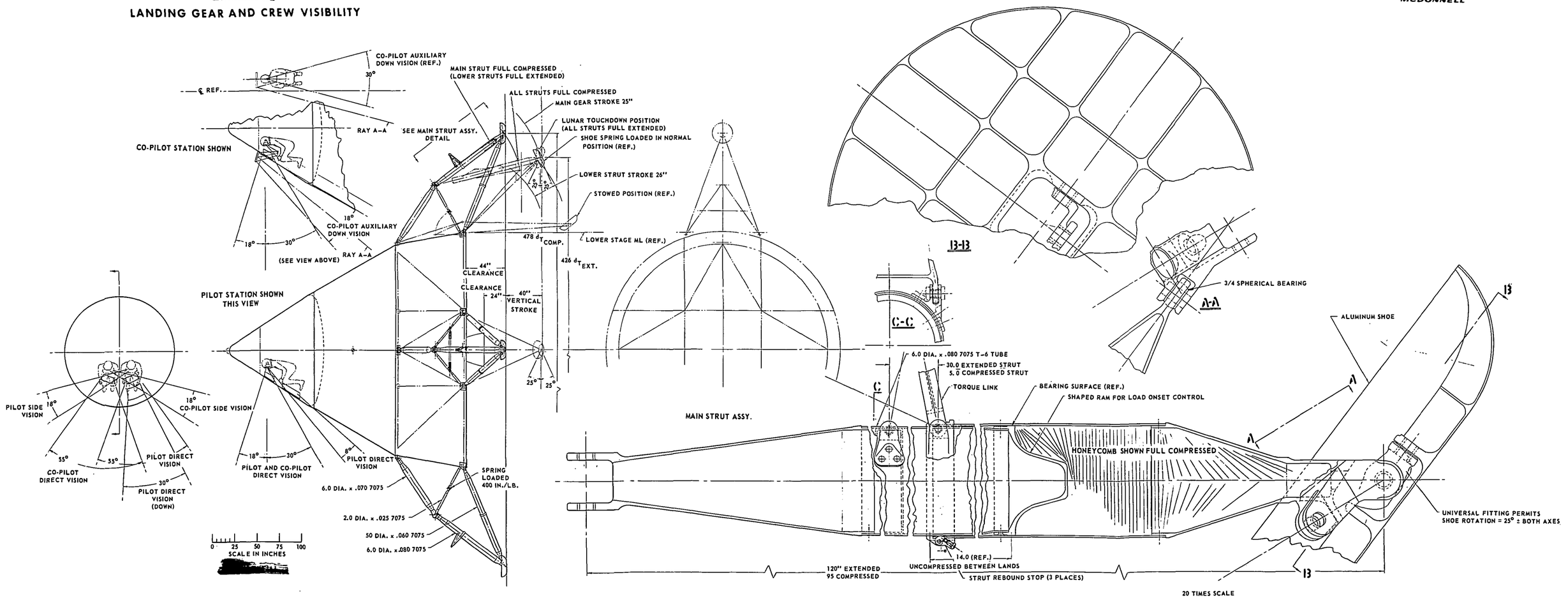




[redacted]

LANDING GEAR AND CREW VISIBILITY

MCDONNELL



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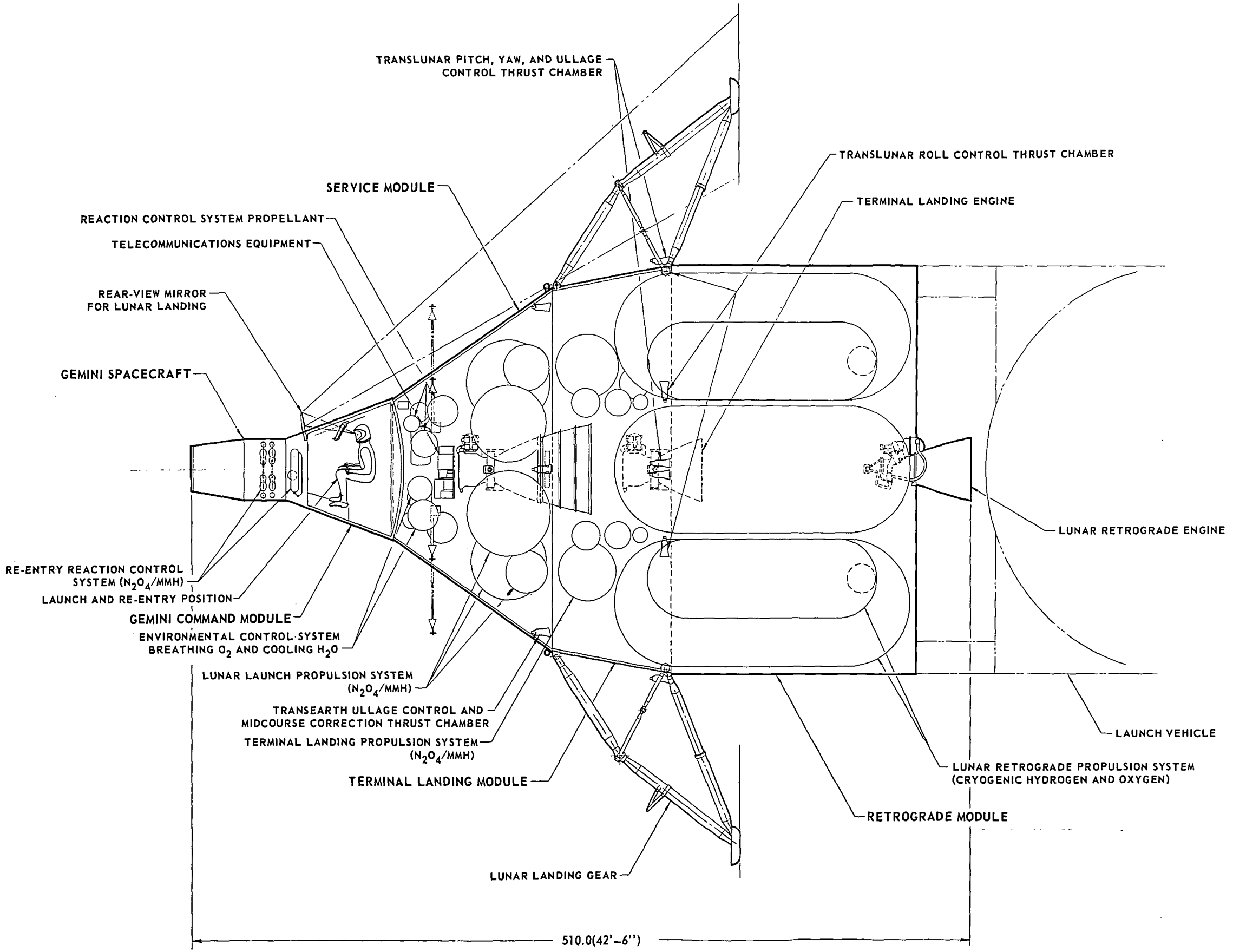
GENERAL ARRANGEMENT - LUNAR GEMINI SPACECRAFT


TRANSLUNAR PITCH, YAW, AND ULLAGE CONTROL THRUST CHAMBER
TRANSLUNAR ROLL CONTROL THRUST CHAMBER
SERVICE MODULE
TERMINAL LANDING ENGINE
REACTION CONTROL SYSTEM PROPELLANT
TELECOMMUNICATIONS EQUIPMENT
REAR-VIEW MIRROR FOR LUNAR LANDING
GEMINI SPACECRAFT
LUNAR RETROGRADE ENGINE
RE-ENTRY REACTION CONTROL SYSTEM (N_2O_4/MMH)
LAUNCH AND RE-ENTRY POSITION
GEMINI COMMAND MODULE
ENVIRONMENTAL CONTROL SYSTEM BREATHING O_2 AND COOLING H_2O
LUNAR LAUNCH PROPULSION SYSTEM (N_2O_4/MMH)
TRANSEARTH ULLAGE CONTROL AND MIDCOURSE CORRECTION THRUST CHAMBER
TERMINAL LANDING PROPULSION SYSTEM (N_2O_4/MMH)
LAUNCH VEHICLE
LUNAR RETROGRADE PROPULSION SYSTEM (CRYOGENIC HYDROGEN AND OXYGEN)
TERMINAL LANDING MODULE
RETROGRADE MODULE
LUNAR LANDING GEAR
510.0(42'-6")

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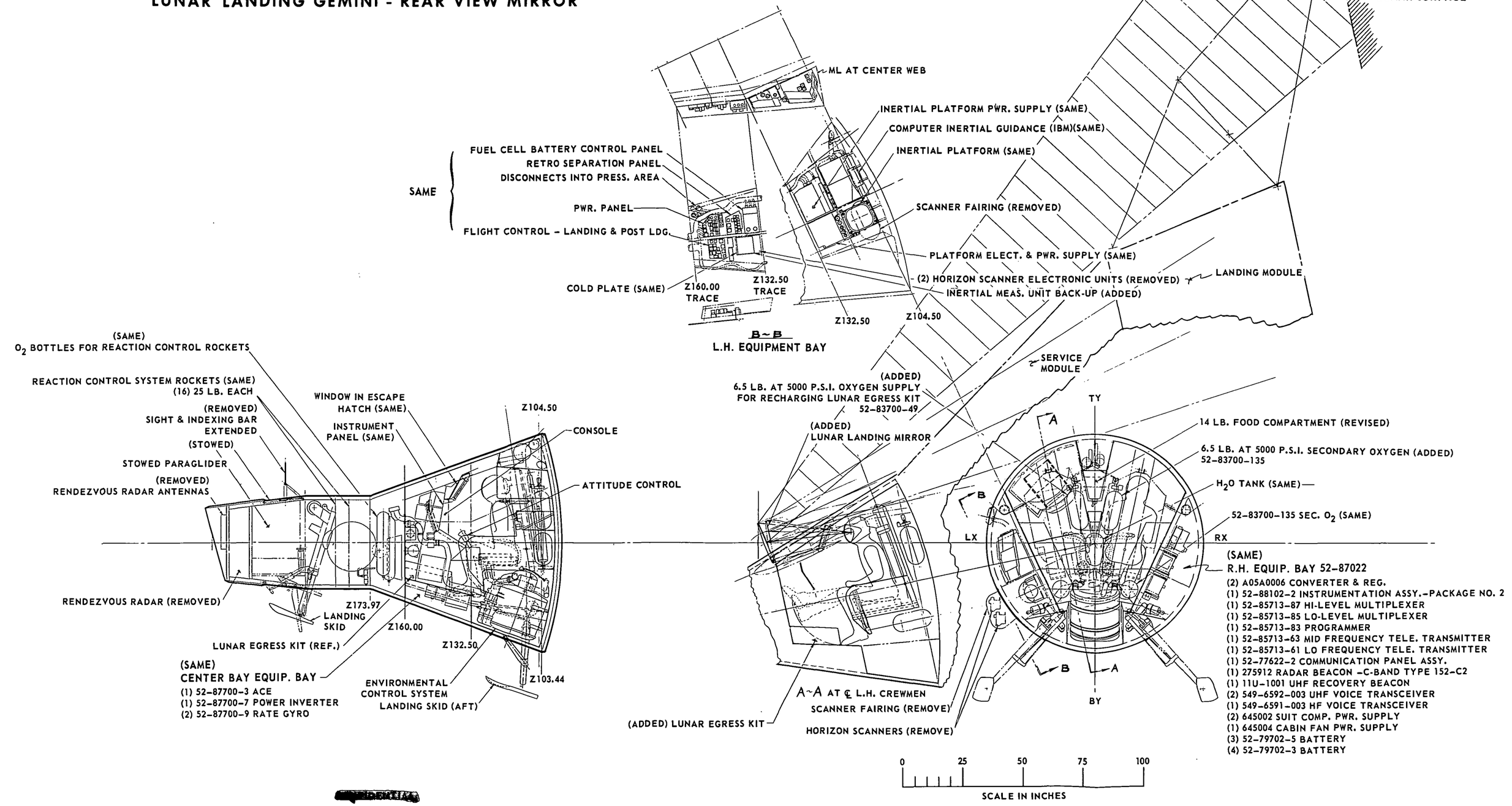
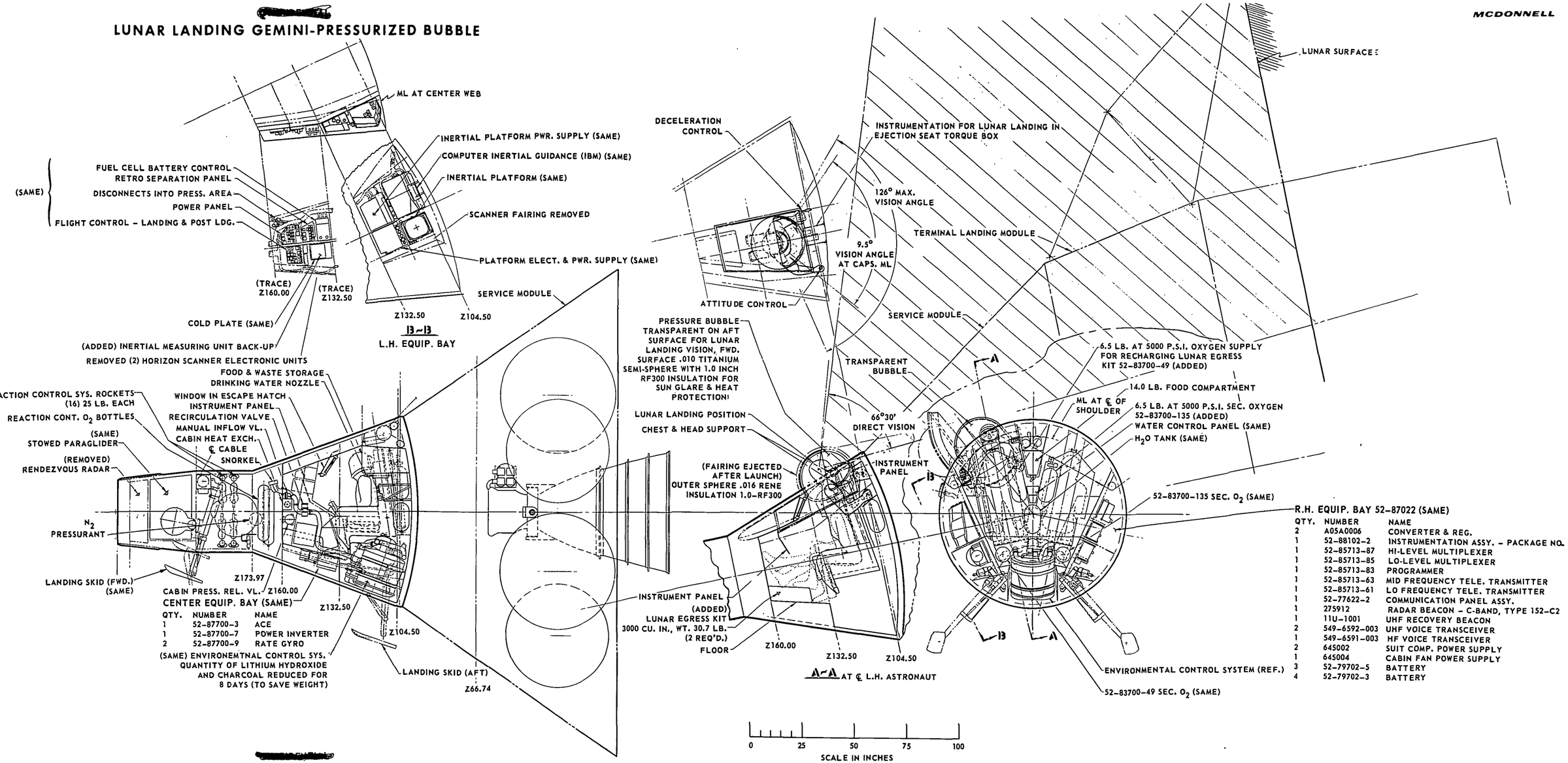
LUNAR LANDING GEMINI - REAR VIEW MIRROR



LUNAR LANDING GEMINI-PRESSURIZED BUBBLE

MCDONNELL

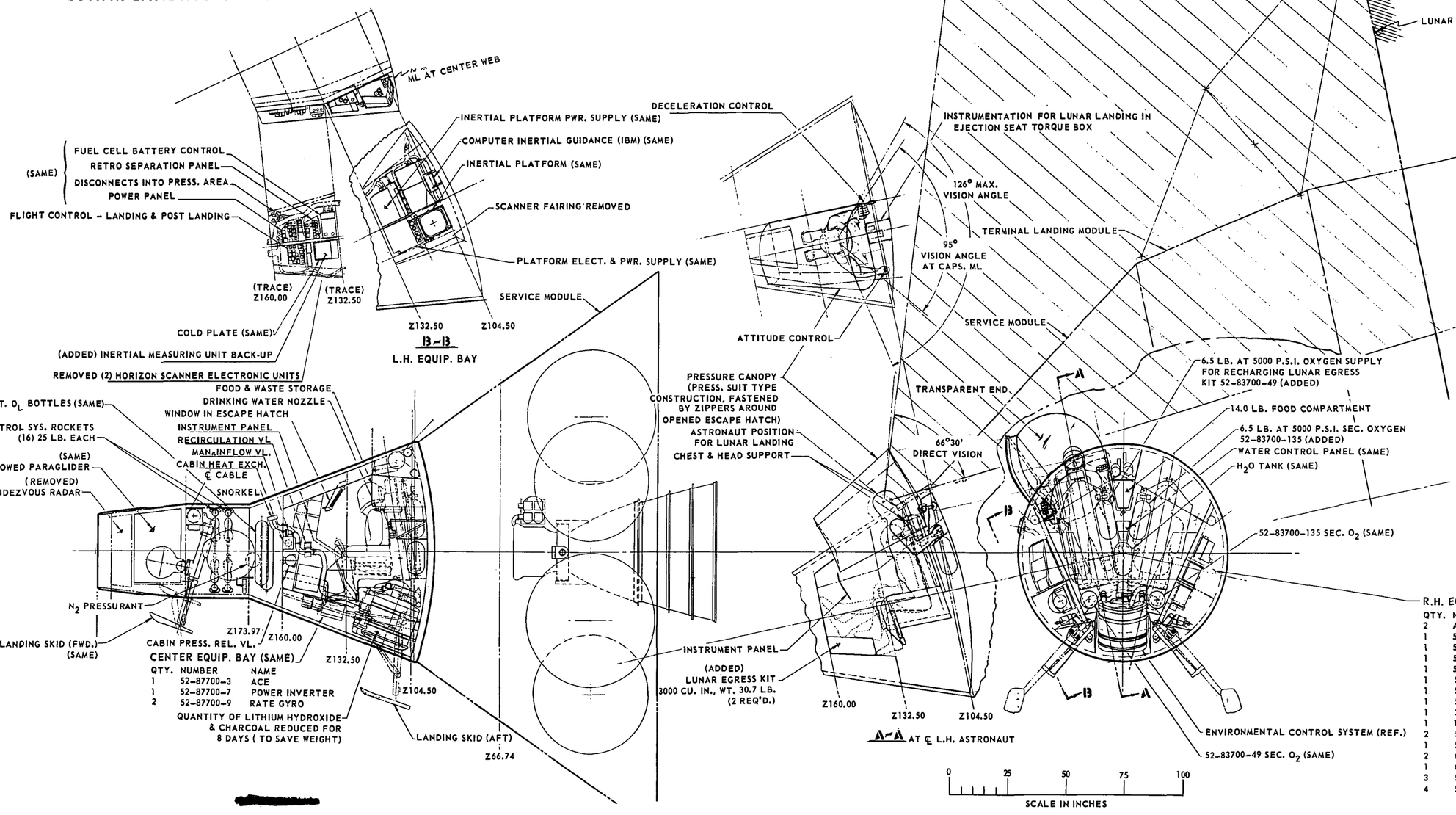

ML AT CENTER WEB
INERTIAL PLATFORM PWR. SUPPLY (SAME)
COMPUTER INERTIAL GUIDANCE (IBM) (SAME)
INERTIAL PLATFORM (SAME)
SCANNER FAIRING REMOVED
PLATFORM ELECT. & PWR. SUPPLY (SAME)
(SAME)
FUEL CELL BATTERY CONTROL
RETRO SEPARATION PANEL
DISCONNECTS INTO PRESS. AREA
POWER PANEL
FLIGHT CONTROL – LANDING & POST LDG.
(TRACE) Z160.00
(TRACE) Z132.50
SERVICE MODULE
COLD PLATE (SAME)
(ADDED) INERTIAL MEASURING UNIT BACK-UP
REMOVED (2) HORIZON SCANNER ELECTRONIC UNITS
Z132.50
Z104.50
13–13
L.H. EQUIP. BAY
FOOD & WASTE STORAGE
DRINKING WATER NOZZLE
WINDOW IN ESCAPE HATCH
INSTRUMENT PANEL
RECIRCULATION VALVE
MANUAL INFLOW VL.
CABIN HEAT EXCH.
℄ CABLE
SNORKEL
REACTION CONTROL SYS. ROCKETS (16) 25 LB. EACH
REACTION CONT. O_2 BOTTLES
(SAME) STOWED PARAGLIDER
(REMOVED) RENDEZVOUS RADAR
N_2 PRESSURANT
LANDING SKID (FWD.) (SAME)
CABIN PRESS. REL. VL.
Z173.97
Z160.00
Z132.50
Z104.50
CENTER EQUIP. BAY (SAME)
QTY. NUMBER NAME
1 52–87700–3 ACE
1 52–87700–7 POWER INVERTER
2 52–87700–9 RATE GYRO
(SAME) ENVIRONEMTNAL CONTROL SYS. QUANTITY OF LITHIUM HYDROXIDE AND CHARCOAL REDUCED FOR 8 DAYS (TO SAVE WEIGHT)
LANDING SKID (AFT)
Z66.74
DECELERATION CONTROL
ATTITUDE CONTROL
PRESSURE BUBBLE TRANSPARENT ON AFT SURFACE FOR LUNAR LANDING VISION, FWD. SURFACE .010 TITANIUM SEMI-SPHERE WITH 1.0 INCH RF300 INSULATION FOR SUN GLARE & HEAT PROTECTION
LUNAR LANDING POSITION
CHEST & HEAD SUPPORT
(FAIRING EJECTED AFTER LAUNCH) OUTER SPHERE .016 RENE INSULATION 1.0–RF300
INSTRUMENT PANEL (ADDED) LUNAR EGRESS KIT 3000 CU. IN., WT. 30.7 LB. (2 REQ'D.)
FLOOR
Z160.00
Z132.50
Z104.50
A–A AT ℄ L.H. ASTRONAUT
INSTRUMENTATION FOR LUNAR LANDING IN EJECTION SEAT TORQUE BOX
126° MAX. VISION ANGLE
9.5° VISION ANGLE AT CAPS. ML
TERMINAL LANDING MODULE
LUNAR SURFACE
SERVICE MODULE
6.5 LB. AT 5000 P.S.I. OXYGEN SUPPLY FOR RECHARGING LUNAR EGRESS KIT 52–83700–49 (ADDED)
TRANSPARENT BUBBLE
14.0 LB. FOOD COMPARTMENT
ML AT ℄ OF SHOULDER
6.5 LB. AT 5000 P.S.I. SEC. OXYGEN 52–83700–135 (ADDED)
WATER CONTROL PANEL (SAME)
H_2O TANK (SAME)
66°30' DIRECT VISION
INSTRUMENT PANEL
52–83700–135 SEC. O_2 (SAME)
ENVIRONMENTAL CONTROL SYSTEM (REF.)
52–83700–49 SEC. O_2 (SAME)
0 25 50 75 100
SCALE IN INCHES

R.H. EQUIP. BAY 52–87022 (SAME)

QTY.	NUMBER	NAME
2	A05A0006	CONVERTER & REG.
1	52–88102–2	INSTRUMENTATION ASSY. – PACKAGE NO. 2
1	52–85713–87	HI-LEVEL MULTIPLEXER
1	52–85713–85	LO-LEVEL MULTIPLEXER
1	52–85713–83	PROGRAMMER
1	52–85713–63	MID FREQUENCY TELE. TRANSMITTER
1	52–85713–61	LO FREQUENCY TELE. TRANSMITTER
1	52–77622–2	COMMUNICATION PANEL ASSY.
1	275912	RADAR BEACON – C-BAND, TYPE 152–C2
1	11U–1001	UHF RECOVERY BEACON
2	549–6592–003	UHF VOICE TRANSCEIVER
1	549–6591–003	HF VOICE TRANSCEIVER
2	645002	SUIT COMP. POWER SUPPLY
1	645004	CABIN FAN POWER SUPPLY
3	52–79702–5	BATTERY
4	52–79702–3	BATTERY

MCDONNELL

LUNAR LANDING GEMINI - PRESSURE CANOPY



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COMMAND MODULE INTERIOR ARRANGEMENT

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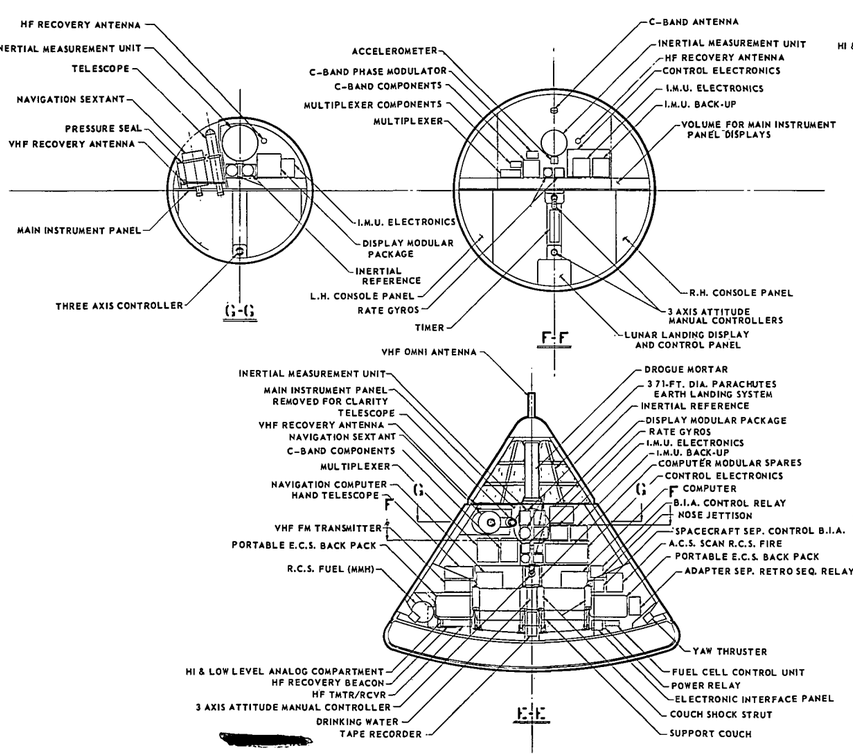

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